



# ***Benefits of JSC's On-site Manufacturing Facility***

Additive Manufacturing  
and  
Advanced Materials Workshop

*Dan Petersen  
Structural Engineering Division/ES  
281.483.8387*

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# Agenda

- JSC Central Manufacturing Core Values
- What is the Purpose of JSC's Central Manufacturing Facility?
- A Walk-through of the Benefits of JSC B9S-B10 Manufacturing Facility



# JSC Central Manufacturing Core Values

- Maintain Core Team of highly skilled Technicians, with vast experience and well trained to work most any given task most anywhere on site
- Perform work to JSC Quality requirements and Safety standards
- Maintain Special Projects and Flight Assembly area (including needed calibrated tooling)
- Precision Cleaning Facility
- Educate Design and Project Engineers in cost-effective design for manufacturing and assembly

## Manufacturing Themes:

- Take the challenging (No Bid) jobs that others can't, won't
- Make the best use of JSC funds – We're "Last Cut" and clean-up



## The Purpose of JSC's Manufacturing (B9S-B10) Facility

- Government Furnished Equipment (GFE) Hardware Development
- Collaboration with Design Engineers, Project Leads
  - To identify processes; prove out concepts and designs
  - Evaluate designs and review drawings for cost-effective manufacturing
- Rapid Response of Hardware Repair/Refurbishment
- Precision Cleaning of Parts and Assemblies
- Specialty Process Development and Process Control



# Benefits – GFE Hardware Development



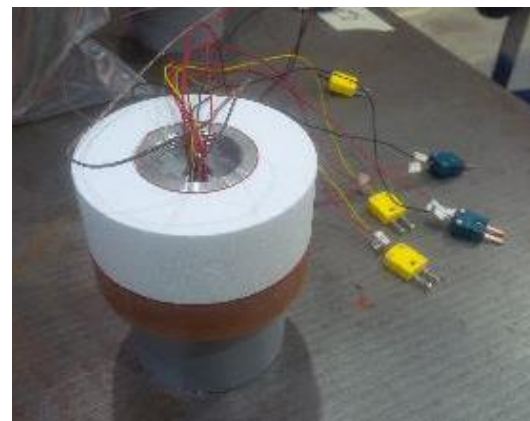
OMS Vibration Fixture and Mass Simulator (2015-16)



Orion Star Tracker Glare Shield (2013)



CPAS Panels (~2011-2017)



Orion Heat Shield Avcoat Stagnation Models (2015)



# Benefits – GFE Hardware Development



**Orion Riser  
Cutter Test  
Frame**

(2015-2016)

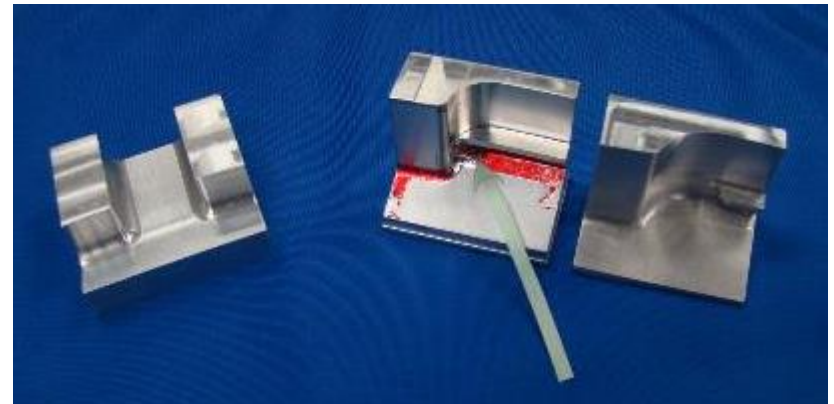




# Benefits – Collaboration Efforts

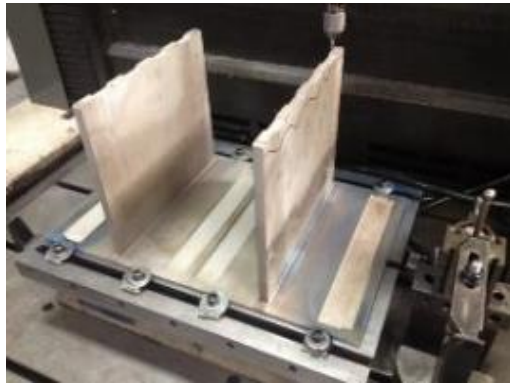
## Orion Full Hatch Development (2015-2017)

- Collaboration of Design and Manufacturing to define: tooling for O-ring Grooves, radius for undercuts and other tooling for select part features



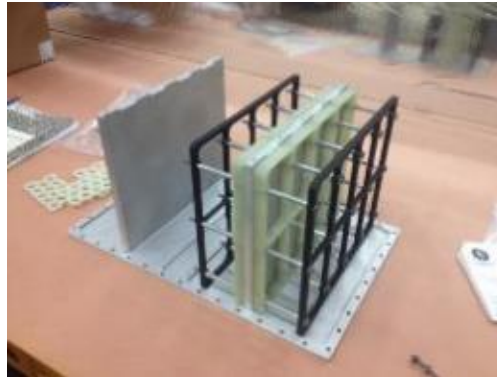


# Benefits – Collaboration Efforts

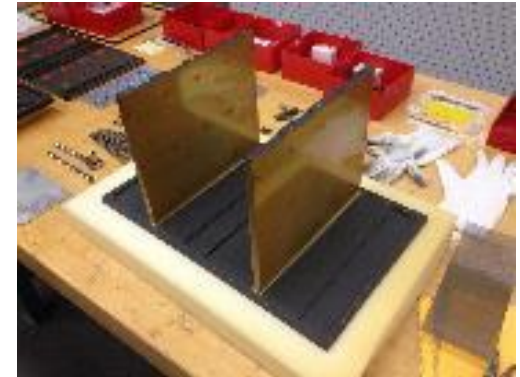


1. Base Plate

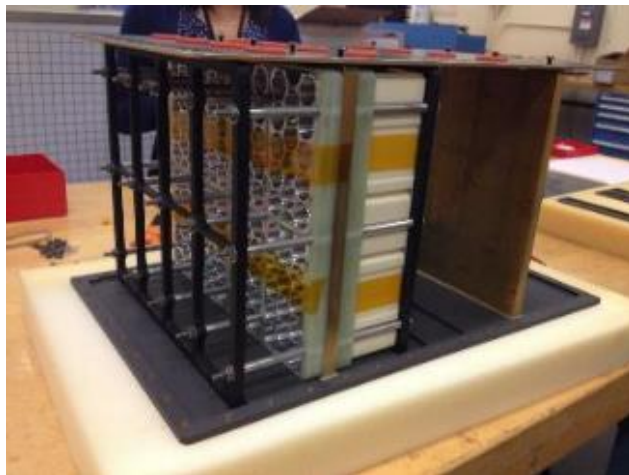
(Outsource EDM, Final Machine B10)



2. Fit-up and Components Check

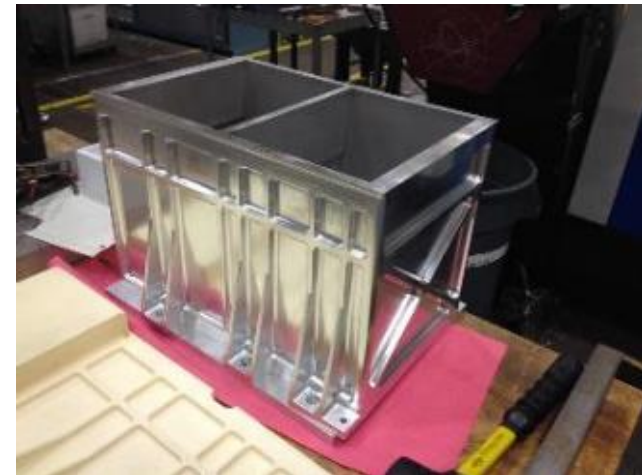


3. Outsource Metal Finish



4. Further Fit-up

## Orion Battery Box



5. Battery Box

(Outsource EDM, Final Machine B10)



# Benefits – Rapid Response & Repair

## Project: Morpheus 2K Engine (2015)

- Burn through of Copper Instrumentation Ring
- Completed repair of Ring: machined out damaged region, custom fit replacement section (with key ways and press to fit), post machined part to original spec, including mods to reattach bracket
- Turnaround within two days to meet project schedule



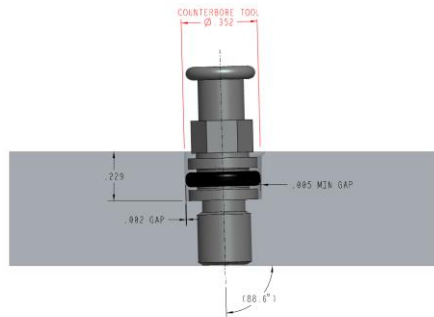


# Benefits – Rapid Response & Repair

- Special Rework of Counterbores



## External High Definition Camera



- Developed custom tooling to measure severity of misalignment of port feature
- Developed custom counter-bore tool to repair feature and assured proper fit of electrical feed through (to maintain pressure integrity)
- From manufacturing start to delivery approximately 3-days
- Similar custom effort to rework Schrader Valves



# Benefits – Precision Cleaning



Class 1000, ISO VI  
Precision Clean Room





# Benefits – Special Process Development

## Aircraft Ops Guppy Brakes

- Coordination with Safety, Occupational Health and Environmental Services to work with Asbestos pads and materials
- Development of (bagging-Autoclave) process to bond Asbestos pads to brake linings





# BACK-UP



# *Manufacturing Capabilities*

- Machining
  - Mill CNC up to 60 inch x 120 inch x 24 inch (height)
  - Lathe CNC up to 18 inch diameter; Lathe manual up to 24 inch diameter
  - EDM Wire; EDM Plunge
- Sheet Metal Fabrication: 10 foot Brake; Water Jet Systems (up to 12 ft. x 6 ft.)
- Welding: GTAW, GTAM, Orbital Welding
- Composites Manufacturing: 5-axis Routers; Autoclaves and Ovens
- Materials Heat Treating: Furnaces up to 2000°F
- Additive Manufacturing: Fortus 4000 MC, Fortus eV, Objet 30 Pro